

**CONFIDENTIAL**NPIC/TDS/D-1107-67  
30 October 1967

MEMORANDUM FOR: Deputy Chief, Technical Development Staff

SUBJECT: Evaluation of Sine-Wave Test Equipment

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1. During the past four to five weeks, I have worked with [ ] of our Exploratory Development Laboratory in evaluating the Sine-Wave Test Equipment built by [ ]

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2. Since I demonstrated an ability for obtaining fairly consistent readings using this equipment, I was elected to take numerous readings at different spatial frequencies for use in the evaluation. This served the dual purpose of furnishing data for John's more detailed evaluation report and allowing me to make an objective study of the instrument. A Ernst Leitz Wetzlar-Summerson, f/3.5, 35mm lens, whose modulation transfer function curve had been computed by the National Bureau of Standards, was used as the test object.

3. While working with the Sine-Wave Test Equipment, it was noted that:

- a. Taking numerous readings sometimes resulted in a noticeable eye irritation and an associated headache.
- b. A variation in readings occurred when reading at the same spatial frequency in two different target groups, i.e., the maximum frequency in target group two and the minimum frequency in target group three, both of which were 100 cycle/millimeter bar targets.
- c. Matching the bar target with the sine-wave filter by magnification adjustment of the zoom microscope was sometimes difficult.
- d. In order to obtain on axis readings at the different spatial frequencies, the equipment had to be translated in two dimensions.

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4. Commenting on the noted peculiarities of the equipment:
  - a. The discomfort problem referred to in sub-paragraph a. of the preceding paragraph could apparently be eliminated by careful focusing of the target image.
  - b. Influence of the surrounding target area is believed to contribute to the variation described in sub-paragraph b..
  - c. The latter two items set forth in the preceding paragraph made operation of the equipment somewhat difficult but not impossible.
5. Curves depicting the modulation transfer function of the test lens have been plotted on the attached graph. Although the three test curves are based on readings at a limited number of spatial frequencies, they show that a variation exists between sets of readings taken at different times.
6. Based on my limited exposure to the Sine-Wave Test Equipment, I question the accuracy of the instrument. Also, a definite degree of care and precision in using the equipment is indicated. This might preclude field use by contract monitors as proposed.

Imagery Systems Br/TDS

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